PRO-CW8-SM35

OTDR / CWDM Channel Analyzer

Revision A
7/2012

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Chapter 1 Using This Manual

This Manual contains information for the PRO-CW8-SM35 which is an OTDR, CWDM Channel Analyzer, Broad Band Power Meter, Stable Light Source, Visual Fault Locator and Video Scope contained in one unit. The beginning of the manual contains general information pertaining to the physical features of the equipment. Please refer to the appropriate chapters for information on the operation of each individual function.

There are warnings, cautions and notes annotated through this manual.

Warning

A warning alerts to situations that could cause personal injury.

Caution

A caution alerts to situations that may cause damage to the equipment or produce poor testing conditions resulting in inaccurate test results.

Note

A special annotation that will assist the user with operational features.

Chapter 2 Safety

Chapter 3 of this manual is a quick start guide. Prior to using the quick start guide or operating the equipment in any way, it is highly suggested the user reads all safety information.

This product has been designed and tested in accordance with the Manufacturer's safety standards, and has been supplied in a safe condition.

This document contains information and warnings that must be followed by the user to ensure safe operation and to maintain the product in a safe condition. Failure to follow these safety warnings, can result in damage to the instrument or harm to the user.

Warning

Personnel should always be aware when working with fiber optic test equipment that active fibers may be present and therefore infrared optical energy may be present.

Warning

Never look directly into the end of a connected fiber optic cable or fiber optic adapter of test equipment, to do so could expose the user to laser radiation and could result in sever personal injury.

Warning

To Prevent Fire or Shock Hazard:

- Do not install battery types other than those specified by the manufacturer
- Do not use the charger without the batteries installed
- Do not expose the battery charger to rain or excessive moisture
- Do not use the AC adapter when there are signs of damage to the enclosure or cord
- Ensure that you are using the correct charger for the local line voltage
- Do not use any other charger than the one provided with this instrument.

Failure to follow these cautions statements may void the warranty of this equipment.

Caution

Fiber-optic connectors are easily contaminated or damaged. The connection to the PRO-CW8-SM35 is a physical contact type of connection and dirty or damaged connectors may impair the instruments capabilities at minimum and at worst result in the need to return this unit to the factory for expensive repairs. Prior to making any connection to the unit, ensure that all proper cleaning procedures have been followed. Use UPC Finish Connectors Only!

Caution

The PRO-CW8-SM35-CWDM maximum power per channel is +5dBm and the Maximum Composite power is +23dBm. Attempting to test greater power levels will cause damage to this instrument.

Chapter 3 Introduction

Thank you for purchasing the PRO-8CW-SM35 multi-tasker, the world's first handheld test and measurement product dedicated to assist you with installation, commissioning and maintenance of the next-gen fiber optic networks. If you're working with upgrading an overburdened network with additional optical channels or installing the latest generation of multichannel high bandwidth fiber links, the multi-tasker will assist with meeting your test and measurement needs quickly and efficiently.

The PRO-8CW-SM35 includes the latest extended dynamic range, high resolution Optical Time Domain Reflectometer (OTDR) technologies as the base platform. As with all of PRO's newest developments, we have incorporated the standard features including Instant-on, autotest and immediate event analysis for fast and trouble free visibility of network distance and loss measurements. Also this instrument includes the standard capabilities of the stabilized singlemode light source with autowave capability, the matching autowave broadband power meter to complete the Loss Test Set (LTS) function, a visible fault locator (VFL) source for nearby fault isolation and fiber identification, and the video scope option for end face analysis. New to the PRO-8CW-SM35 is the inclusion of the 8 channel ITU grid multi spectrum (OSA) power analyzer for simultaneous measurement of the upper 8 CWDM wavelengths utilized in the latest high bandwidth networks.

The multi-tasker provides a startup menu to select from the OTDR, VFL, LTS, SCOPE, and OSA function immediately upon energizing. This feature is coupled to each instrument for immediate analysis of important features of your link. Before connecting the instrument to your fiber under test, it is good practice to examine the optical patch connectors with the optional high resolution 200x or 400x video scope probe and collect an image to attach to your link documentation. For basic link analysis the OTDR can then be connected and an autotest can immediately provide link loss and distance results on single mode fiber at the popular 1310nm and 1550nm wavelengths. The construction mode can be selected to automatically collect and file both fiber signatures.

The on-board Loss Test Set completes the standard package of documented results necessary to commission a system, or can be utilized for pass fail analysis of network power throughput. The advanced autowave feature is a must to improve the efficiency and reliability of measuring at both 1310nm and 1550nm radiation, but as a broadband power meter it is calibrated for system end to end loss analysis at all popular fiber optic wavelengths with your sources.

For commissioning or troubleshooting a multi-wavelength system, the 8 channel CWDM can be utilized at various points to detect proper power levels from each source and appropriate add/drop connectivity settings at each adjustable node on the network. The channel analyzer provides immediate real time power measurement results of all 8 channels from 1471nm to 1611nm simultaneously and also analyzes and displays statistical measurements at each ITU grid channel. Of course documentation of all these results is accomplished at the push of a button.

PRO has many advanced measuring instruments for use with multiple wavelength multimode and singlemode systems from CWDM wavelength OTDR analyzers, DWDM MiniOSA devices, DWDM Tunable Laser sources, Variable Optical Attenuators, Loss Test Sets, Video Scopes, as well as PON OTDRs with 1625nm active out-of-band coverage. Please enjoy the use of your new PRO-8CW-SM35 multi-tasker, and again thank you for considering PRO. Please follow the next section's simple startup instruction to get right to work with your PRO test and measurement equipment.

Chapter 4 OTDR Quick Start Guides

4.0 Quick Start Guides

4.1 OTDR Quick Start Guide

Press to turn on the OTDR.

The OTDR function will be highlighted. Press to initiate the OTDR application.
Connect the fiber to the appropriate port. (Select Multi Mode or Single Mode if OTDR is a quad wavelength unit)

Press to enter the Menu mode.

Use the Scroll Wheel to highlight the in the icon list.

Press to cycle to the desired wavelength. The OTDR will start a scan at the parameters displayed.

If approximate fiber length is not known:

Press the button after selecting the wavelength, (Press on Range Finder) the Auto Test feature will start and set an appropriate pulse width and range automatically.
If approximate fiber length is known:

Press and scroll to:

Press to cycle through the averaging times of - R/T for real-time, Short for a 10 second average time or Long for a 5 minute averaging time.

Press to cycle through the pulse width - select 2m for fibers up to 4 kilometers, 10m for fiber up to 16 kilometers, 100m for fibers up to 64 kilometers or 1k for fibers up to 2 40 kilometers.

Press to toggle between to available range settings.

Press to exit the menu mode.

To manually start a scan: Press while the unit is idle.

To stop a scan: Press while the unit is scanning.

To view the Event table: Press to enter Menu mode and use the Scroll Wheel to highlight the Show Event soft key and press the button to change to the event analysis mode.

4.2 CWDM Channel Analyzer Quick Start Guide

Press to turn on the PRO-CW8-SM35

Using UPC finish connectors only, connect the fiber to be tested to the “CWDM Optical Port” and press the button

to start a scan.

Note

There is an activity indicator in the bottom left of the display, (see figure.8.3) When the indicator is red, the unit is ready to scan, to start scanning, press the Scan button. When the Channel Analyzer is scanning, the activity indicator will be green

The number of channels displayed may be limited by using the Span Start , Span End or Span Zoom features. These features are fully described in section 8.4 of this manual.

Note

Scale Minimum Power and Span Minimum power are not applicable on the PRO-CW8-SM35-CWDM Channel Analyzer.

4.3 Loss Test Set Quick Start Guide

Press ⏻ to turn on the OTDR.

Use the Scroll Wheel to highlight the LTS function icon and press select.

Connect a properly prepared reference cord to the power meter port and the light source port. (If the unit is a quad wavelength unit, ensure the proper port is connected)

Press Menu and use the Scroll Wheel to highlight the Source soft key at the top left of the display.

Press select to energize the first wavelength. Once stabilized, use the Scroll Wheel to highlight the REF icon on the right side of the display. Press select to set the reference for that wavelength. If a second wave length is going to be tested, scroll back to the Source soft key and press select to cycle to the next desired wavelength and repeat the step to set the reference.

Press Menu to exit the Menu mode.

To conduct a Manual Test

If using the OTDR as the light source, perform reference procedure as above and place fiber under test in line between the reference cord and the power meter port. Ensure you are in Menu mode and Scroll to Source soft key.

Press select to cycle through the wavelengths and choose the wavelength to be tested.

Press Menu to exit Menu mode.

Press select to store the measurement to the location indicated in the bottom left of the display.

To conduct an Auto Test

Note: Setting a reference in Auto Test mode is not necessary. The source is modulated and a Reference of -3dBm (-6dBm-1625) is assumed.

Connect fiber to be tested, press the AutoTest button and the light source will cycle to test each wavelength, the power meter will read the signal and hold test in temporary memory until the select button is pressed and the test is stored into the memory location indicated at the bottom left corner of the display.

Ensure that the unit has cycled through all the desired wavelengths prior to pressing the select button.

Auto Test will be displayed at the bottom of the display to indicate the Auto Test Mode.

Chapter 5 Preparation For Use

5.3 Inspection

Before shipment, this instrument was inspected and found to be in perfect working order and free of defects.

The shipping carton contains the following:

1. Hand Held OTDR/OSA, with protective boot and 8-AA NiMH batteries installed
2. Universal AC/DC charger with interchangeable mains
3. USB cable
4. Manual on CD with Windows™ compatible software and user's manual
5. Set of interchangeable adapters, SC and FC, for each OSA port.

5.2 Identification and Configuration

The instrument's Model/Part Number, Serial Number and Date of Manufacture are indicated on a label located on the bottom plate of the unit. The instrument's history is filed at the factory by model/part number and serial number.

Fig 5.1

5.3 Power Requirements

The PRO-CW8-SM35 is equipped with a 100-240V-0.4A input and 13.6V, 0.75A, center positive output universal AC/DC battery charger. This charger is supplied with interchangeable mains for US, Great Britain, Europe and Australia The unit is shipped with 8-AA NiMH batteries (2700mA hours). Depending on usage, fully charged battery pack will typically enable approximately 8 hrs. of use. Fully discharged batteries require 6 - 8 hours of recharging.

5.3 Power Requirements (Continued)

Battery replacement is not recommended; however, if you must replace the batteries, follow this procedure. Unplug external power supply and ensure the unit is turned off. Carefully remove unit from protective boot and remove the two screws from top plate and bottom plates that retain the back cover. Carefully remove back cover and remove the two screws that hold the battery covers in place. Replace only with 8 high quality AA NiMH batteries. Do not use batteries that are rated at less the 2500mAh. If you install NiMH batteries that are dead or less than 1 volt each, charge these batteries for one (1) hour before using the unit. For maintenance, batteries require a monthly periodic recharge.

Warning

To Prevent Fire or Shock Hazard:

- Do not install battery types other than those specified by the manufacturer
- Do not use the charger without the batteries installed
- Do not expose the battery charger to rain or excessive moisture
- Do not use the AC adapter when there are signs of damage to the enclosure or cord
- Ensure that you are using the correct charger for the local line voltage
- Do not use any other charger than the one provided with this instrument.

Failure to follow these caution statements may void the warranty of this equipment.

Chapter 6 Description

6.1 Instrument Description

Insrument Enclosure
The FTE7800 is packaged in a rugged aluminum housing which is further protected with a rubberized boot. Although the front panel is weather resistant, care must be taken to avoid liquids and contaminants around the fragile optical and electrical connectors, and the glass display. Use a mild cleaning agent and damp soft cloth to clean up the panels and the outside case. See the maintenance section to clean the optical connector. NEVER open the instrument for cleaning. Return to the factory for servicing if necessary.

Display
This units is equipped with a 4” color TFT display

Key Pad
The FTE7800 is equipped with a 7 button key pad. For a full description of functions, please see the section of the manual that is dedicated to function being operated.

Scroll Wheel
The scroll wheel is used to navigate through menus, move cursors and make adjustments to settings.

6.2 Physical

Front Panel

Fig 6.1

Top Plate

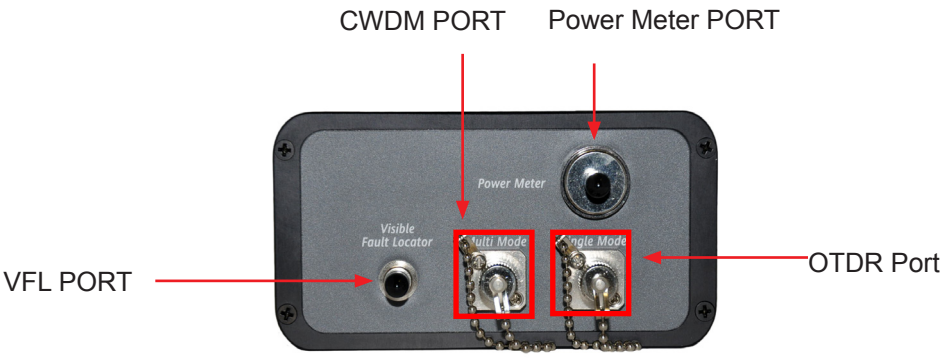


Fig 6.2

Bottom Plate

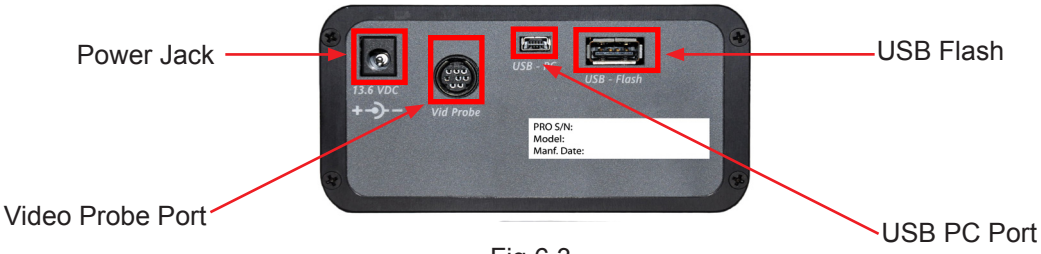


Fig 6.3

6.3 Home Screen

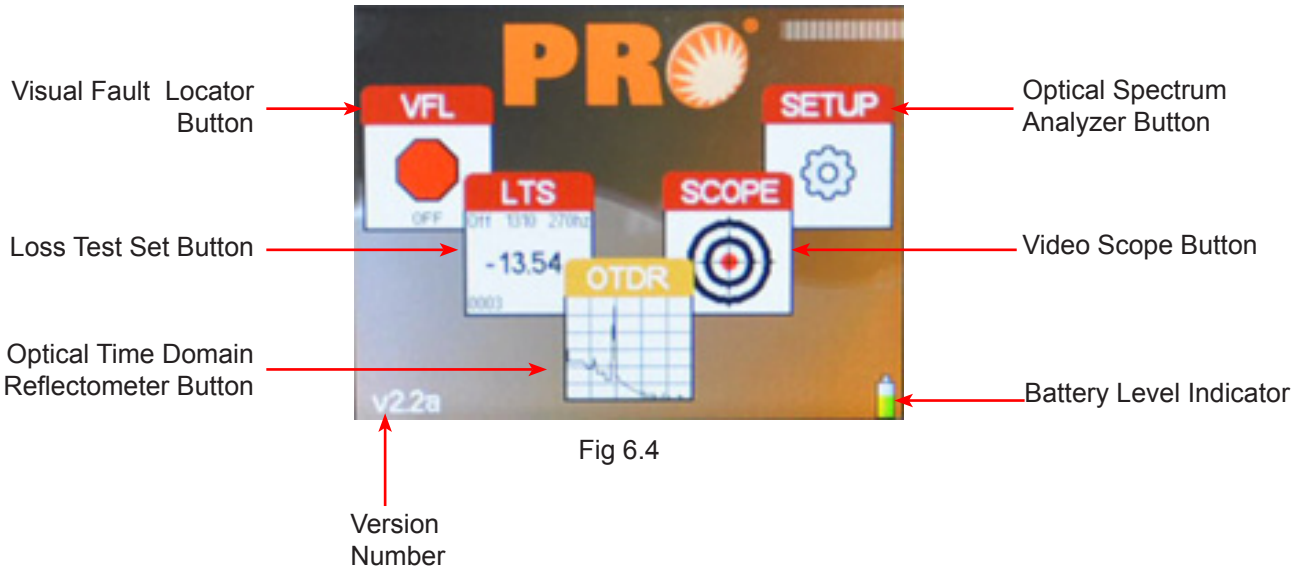


Fig 6.4

6.3 Icon Definitions

The list below and on the next page contain the icons found on the PRO-CW8-SM35 units. They control features and functions, and allow the user to set testing parameters. This table gives the name and a brief explanation of each. More detailed explanations will be found in later sections of this chapter and in chapters to follow.

Setup Icons

	Date/Time	Used to set the time/date
	Back Light	Toggles on and off the back light
	Speaker	Toggles on and off the speaker
	Baud Rate	Used to manually set the baud rate for USB/PC communications
	Home	Returns the user to the Home Menu

OTDR Icons

	Help Feature	Accesses the help files
	LSA Adjustments	Used to adjust the LSA splice loss areas
	File Management	Used to enter the File Management
	Tool Box	The Tool Box contains equipment features, and operational parameters that are seldom changed

OTDR Toolbox Icons

	Resolution	Used to set the OTDR to Low or High Resolution
	Unit of Measure	Use to set the Unit of Measure to Kilometers, Kilofeet or Miles
	Cursor Lock	Used to Lock the “A” and “B” cursors movement
	Loss Mode	Used to Select Splice or LSA loss modes or to disable the loss mode
	Calibration	This is reserved for factory use

6.3 Icon Definitions (continued)

OTDR Icons (continued)

IOR	Index of Refraction	Used to set the Index of Refraction from 1.024 - 2.048
	Lambda	Cycles through the wavelengths available for use on the OTDR
AVG	Average	Cycles through the average mode available
PW	Pulse Width	Cycles through the available pulse with for a selected range
RNG	Range	Cycles through the available ranges on the OTDR
	Home	Returns the user to the Home Menu
	Battery Icons	Indicates the charge status of the batteries. When operating on AC power, an AC plug will be displayed next to the battery.

Channel Analyzer Icons

	Help Feature	Accesses the help files
TRC	File Management	Used to enter the File Management
	Lambda	Used to change channel measurements to wavelength or frequency
	Home	Returns the user to the Home Menu
CAL	Calibration	This is reserved for factory use
	Battery Icons	Indicates the charge status of the batteries. When operating on AC power, an AC plug will be displayed next to the battery.

6.3 Icon Definitions (continued)

LTS Icons

	Help Feature	Accesses the help files
	File Delete	Delete Loss Test Set files
	File Download	Download File to the computer via USB cable
	Lambda	Used to filter power meter wavelengths out of Autotest Mode.
	Reference	Used to set nonvolatile reference
	dBm/dB	Used to set measurement unit to dBm or dB
	Calibration	This is reserved for factory use
	Home	Returns the user to the Home Menu
	Battery Icons	Indicates the charge status of the batteries. When operating on AC power, an AC plug will be displayed next to the battery.

Chapter 7 General Features and Setup

7.0 General Features and Setup

7.1 General Features

Battery Level/Power Indicator

The bottom right hand corner of the screen shows the battery level indicator. In the final hour of operation the battery will change to red. A warning indicator will sound a few minutes before the instrument automatically turns off. An AC plug will be displayed next to the indicator bar if the unit is operating with the AC power supply/charger. There is also a red charge light in the top right corner of the front panel. This will glow red when the unit is charging.

Caution

Ensure the unit is turned off before plugging or unplugging the AC power supply/charger.

USB Flash Drive

Located on the bottom panel is the USB Flash Drive port. Scan file and Scope files may be downloaded the external memory device. Screen Shots are downloaded directly to the USB flash drive.

Note

Flash drives of 4 GB or less are supported.

USB/PC

Located on the bottom panel is the USB/PC port which may be used to connect the Optical Spectrum Analyzer to a computer to download stored data for analysis with the supplied Windows™ compatible software.

7.2 Setup Menu

The following features are accessed from the setup menu. To access the setup menu, press the Menu button while on the Home Screen. To exit the setup menu at any time press the Menu button again.

Set Date and time

The PRO-CW8-SM35 applies a time/date stamp to the saved Scans. The date is configured MM/DD/YY and the time is a 24 hour format set in the eastern time zone. To change the data and time, Press the Menu button to enter the menu mode, scroll to the Clock icon and press the Select button. The dialog box with the settings will be displayed. Use the scroll wheel to change each segment, use the Select button to move between segments, and to Save/Redo/Cancel. Use the scroll wheel to select Save, Redo or Cancel then press the Select button again to complete setting the date and time. This setting has a memory of approximately one month of no instrument activity. To recharge the memory, turn the instrument on for 5 minutes per month or during the monthly battery charge if the unit is not used for a long period.

7.2 Setup Menu (Continued)

Brightness

To set the Back Light press the Menu button to enter the menu mode, scroll to the Tool Box icon, press Select and use the scroll wheel to highlight the Backlight icon, press the Select button to toggle the back light to Bright or Dim. The status is displayed at the top of the display. Press the Menu button to exit the Tools Box.

Sound

To toggle the speaker on or off, press the Menu button to enter the menu mode, scroll to the Tool Box icon, press Select and scroll to the Speaker icon, press the Select button to toggle the speaker on and off. The status is displayed at the top of the display. Press the Menu button to exit the Tools Box.

Baud Rate

The Baud rate is set to auto detect for use with the software. If it is necessary to make an adjustment to the Baud rate, press the Menu button to enter the menu mode, scroll to the Tool Box icon, press Select and use the scroll wheel to highlight the Baud Rate icon. Press Select, use the scroll wheel to make a selection, press Select again and the unit will exit to the menu mode and return to the main screen.

Home

Highlight the Home icon and press Select to return to the home page

8.0 OTDR Operation

8.1 Key Pad

Fig 8.1

Power button, turns the unit On and Off. (Hold for 1 second)

Scan — This key will start a scan or stop the current scan.

AutoTest — This key starts autotest range finder and construction mode scans. The range finder checks test conditions and starts a scan at the wavelength selected by the user but allows the OTDR to determine the pulse width and range parameters. The AutoTest button is also used operate the construction mode. The first time this button is selected in a user session, a dialog box will be displayed asking the user to choose between range finger and construction mode. If during a user session it is desired to change the value of this button, holding it down for greater than one second will recall the selection dialog back to the screen allowing the user to change the function of the button.

Menu — Toggles between the Trace Mode where the focus of the Scroll Wheel and the Select Button are on the active cursor and the Menu mode where the Scroll Wheel moves through the Soft Key Menu and the Side Icon Bar.

A/B — Toggles between A and B as the active cursors.

Zoom — Selects the Zoom level, each press increments through the levels of 1x, 2x, 4x, 8x, 16x and 32x.

select — While in Trace Mode the Select button will move the "Active" cursor to the next event. While in Menu Mode, the Select button actuates highlighted item.

While in Trace/Graph Mode the capacitive scroll wheel moves the A and B cursors. While in Menu Mode it highlights soft keys and icons and while in Table Mode it highlights files and events.

8.2 OTDR Display

Trace display

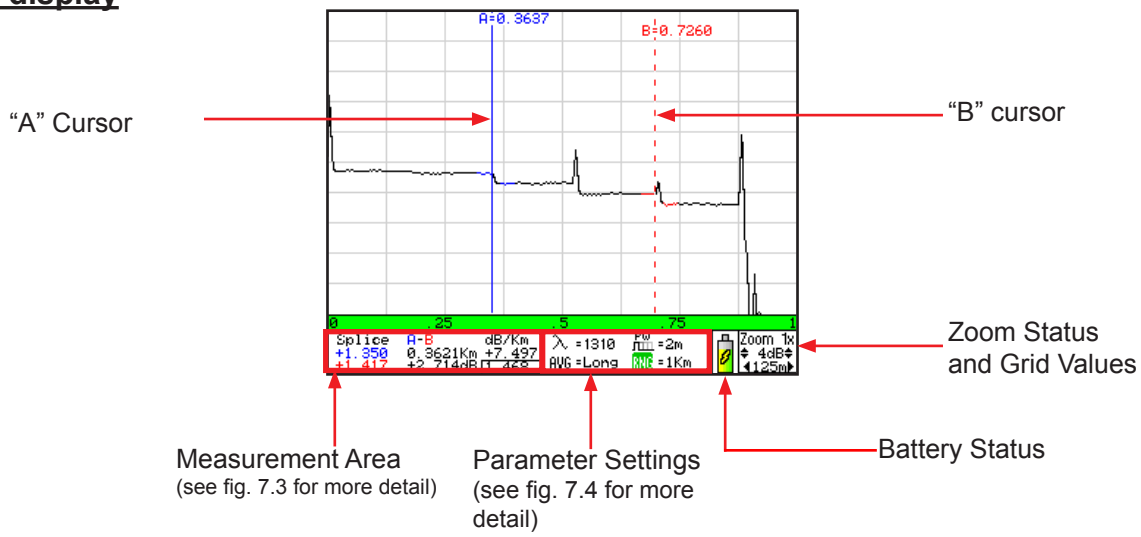


Fig 8.2

Trace Measurements

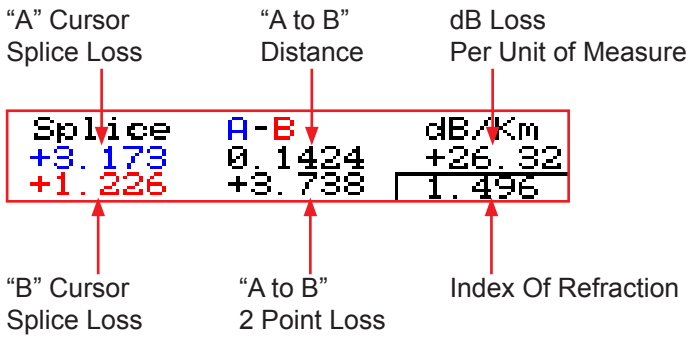


Fig 8.3

Trace Parameters

Fig 8.4

OTDR Display with Menu Open

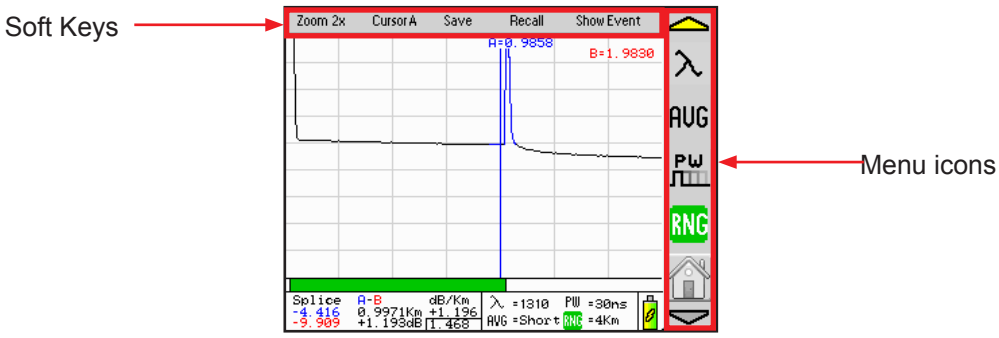


Fig 8.5

8.3 OTDR Tools Menu

Below is a list of the settings available through the Tools Menu in the OTDR mode. Press the Menu button to open the Menu mode, scroll to the Tools icon and press the Select button. Scroll to the desired setting and press Select to open.

Resolution

The resolution tool should be highlighted. Use the Select button to toggle between Low and High. This resolution feature affects the ranges of 4km and 16km. At low resolution 4km range, data points are ¼ meter apart and at high resolution, the data points are 1/8 meter apart. At 16km range, the low resolution date points are 1 meter apart and at high resolution the data points are 1/8 meter apart.

Unit of Measure

The distance unit of measure may be either displayed in Kilometer (Km), Kilo feet (Kf) or Mile(Mi). Scroll to Unit of Measure icon and use the Select button to toggle between Km, Kf or Mi. Press the Menu button to return to the trace display.

Cursor Lock

The cursors may be lock for accurate measurements. To lock the cursors press the Menu button, scroll to the Tools icon and press the Select button. Scroll to the Cursor Lock icon and press Select to toggle the lock cursor mode on and off. In the lock cursor mode, with the A cursor as the active cursor, both A and B cursors move and with the B cursor as the active cursor, the B cursor will move independently in order to set the distance between the two cursors

8.3 OTDR Tools Menu (Continued)

Loss Mode

Loss Mode setting allows the user to set the splice loss measurement to be displayed to either simple splice loss, LSA (least squared averaged) or shut off this measurement to limit the amount of information on the display.

Splice Loss

Splice Loss method is meant to be used in noisy environments when it is difficult to attain an LSA area that lays flat on the back scatter before and after the cursor. See section 8.9 - Setting Splice Loss Measurement Areas. This method takes an average of the selected points before and after the active cursor and uses this average to make a good estimation of the event loss. This is an estimation but this method may be more accurate than LSA Splice Loss method in noisy environments.

Least Squares Approximation (LSA)

LSA Splice loss method gives the user a visual aid in setting splice loss areas. The splice loss lines must be set to overlay the backscatter of a trace without over lapping any other events. The LSA areas are set properly when the LSA visualization lines overlay the back scatter sections of the trace before and after the event. This method can be more accurate by affording the ability to see the slope of the splice loss areas, however: it can also supply a reading with greater error if not used properly. Please see Fig 8.7, 8.8 and 8.9 for examples of LSA settings. In Noisy environments the LSA Lines will have an exaggerated movement making the Basic Splice Loss Measurement potentially more accurate.

The Splice loss measurement may also be disabled if these measurements are not require for testing.

Enter Calibration

This tool is for factory use.

8.4 Auto Test

Warning

Before connecting to a patch cord or fiber under test, be certain the fiber has no active optical sources or instruments connected to the other end. Skin or eye damage could result from other high power sources e.g. EDFAs, or instrument damage could occur voiding the warranty.

Warning

Clean connector thoroughly prior to connection to the appropriate port of the OTDR. Failure to ensure the connectors used with the OTDR are properly cleaned can result in poor launch conditions at the minimum or damage that requires the unit be returned to the factory for repair.

Note

The first time Autotest is press upon power-up, a dialog box will be display to set the function of the button. Use the scroll wheel to move between the Range Finder and Construction Mode. Press the Select button once the desired function is highlighted. To change the function once set in a user session, press and hold the Autotest button and the dialogue box will be displayed again.

Range Finder

This is a useful feature when the approximate length of the fiber to be tested is unknown. The Range Finder feature tests at the wavelength selected by the user. To set the wavelength, press the Menu button, scroll to the Lambda icon and use the Select button to cycle to the desired wavelength. Press the Autotest button, the unit will set the average time to short, starts a scan and flashes Auto in the pulse width and range parameters. When Auto stops flashing the unit has set the pulse width and range, then completes the test and displays the trace.

Construction Mode

This is useful when a large number of fibers need to be tested with the same settings at multiple wavelengths. To operate in Construction mode, set the Autotest button to construction mode in the manner described above. The Construction Mode tests up to two wavelengths at one time, displays the two traces and saves the traces to the next two available storage locations.

Follow these procedures to test in Construction mode:

Set Wavelengths:

Set the wavelengths to be tested by pressing the Menu button, scrolling to the Tools icon and pressing Select. Scroll to the Set Wavelength Filter tool and press Select. Grayed out wavelengths are turned off. The wavelengths in black text are active. To select wavelengths, scroll to highlight the wavelength and press the Select Button. To complete the process, scroll to Save and press select. Press Menu again to close the Tools dialogue box.

Set Test Parameters:

Check the Average Time, Pulse Width and Range to ensure they are set properly. Refer to section 8.5 for instructions on setting these parameters.

Note: Real Time is not recommended as an averaging time for Construction mode.

Set File Name:

It is necessary to set the base file name prior to starting the test. To establish the file name, press the Menu button and scroll to the File Management icon and press Select. Scroll to an empty file location and press Select. Name the file by using the scroll wheel to display the desired letter or number and press Select to move to the next Character. Do not press select to enter the last character. Once it is displayed, press the Menu button and Save Changes soft key will be highlight, press Select or use the Scroll Wheel to select Discard Changes and press Select. All future files will use the new base file name until it is change. The file that was just created may be deleted if desire by following the procedures in section 10.9.

Set Default Notes:

To enter default notes for trace files, enter the File management as above and scroll to any empty location. Press the Menu button, scroll to the Notes soft key and press Select. The first Character of the note box is highlighted. Use the Scroll Wheel to select the desired character and press select. Continue on until the note is complete. To erase the characters and move forward, use the “blank”. To quickly return to the beginning of a note, press the Menu button and then the Select button on the Notes soft key. To exit the Notes box, press the Menu button. This note will now be the default note for all traces until it is change

8.4 Auto Test (Continued)

Conduct Tests:
Connect a fiber to the proper test port and press the Autotest button. The OTDR will conduct the test at the first wavelength and store the trace in temporary memory using the base file name given, with default notes attached. The second wavelength is then started and once complete the traces stored to memory, and then both traces are displayed for review.

Disconnect the fiber, connect the next fiber and press Autotest. The two tests will be completed stored and displayed. Continue on until all fibers are tested.

8.5 Manual Scan Settings

After powering on the OTDR, Enter the menu mode by pressing the Menu button and scroll to the parameter keys to set all the necessary parameters to the appropriate values. These parameters include:

Resolution
Enter the Menu mode, scroll to highlight Tools icon and press Select. The resolution tool should be highlighted. Use the Select button to toggle between Low and High. This resolution feature affects the ranges of 4km and 16km. At low resolution 4km range, data points are ¼ meter apart and at high resolution, the data points are 1/8 meter apart. At 16km range, the low resolution date points are 1 meter apart and at high resolution the data point are1/8 meter apart.

Note
The resolution setting does affect speed and internal storage capability. At the 16km range, high resolution vs. low resolution, the trace could take up to 8 times longer to complete and trace file sizes could be up to 8 times larger, decreasing file storage capability. High resolution mode at the 4km range could cause the trace time to double as well as the file size. To determine the amount of trace memory available, enter file management, scroll to the view tab and select “Stats” from the drop down menu. This will show the number of traces saved and the number of traces that can still be saved in the internal memory.

Note
To determine the amount of trace memory available, enter file management, scroll to the view tab and select “Stats” from the drop down menu. This will show the number of traces saved and the number of traces that can still be saved in the internal memory.

Index of refraction (IOR)
It is necessary to have the Index of Refraction set as close as possible to the actual IOR of the fiber. If this is unknown it is best to use the default setting on the OTDR. To change the IOR, highlight the IOR icon and press the Select button. Use the Scroll wheel to change the IOR value. When the desired value is reached, press the select button again and the OTDR will prompt the user to save or cancel the changes. Use the scroll Wheel to highlight desired action and press the Select button.

8.5 Manual Scan Setting (Continued)

Wavelength
Use the scroll wheel to highlight the Lambda key, press select to cycle through the available wavelengths.

AVG
Use the scroll wheel to highlight the Average (AVG) icon and use Select button to cycle through, Real-time averaging, with a up to 2 pps refresh rate, Short average (~30 seconds) or long average (~10 minutes). Changing this setting will also initiate a scan.

Pulse Width
Use the scroll wheel to highlight the PW icon and use the Select button to cycle through the available pulse widths for the selected range. The pulse widths are listed in the table below.

Range
Use the scroll wheel to highlight the RNG icon and use the Select button to choose the desired range. Available ranges are listed in the table below.

Pulse Width

Range	5ns	10ns	30ns	100ns	300ns	1µs	3µs	10µs	20µs
1km	■	■	■	■					
4km			■	■	■	■			
16km				■	■	■	■		
64km						■	■	■	■
256km							■	■	■

Fig 8.6

8.6 Viewing a Trace

Zoom
There are five zoom levels, 1x, 2x, 4x, 8x, 16x and 32x. The current level is indicated in the bottom right corner of the display with the values per division. Press the Zoom button to cycle through the zoom levels. When in the Menu mode, pressing select while the Zoom soft key is highlighted will also cycle through the zoom levels.

8.6 Viewing a Trace (Continued)

Note

The values per division change with each change of the zoom level and are indicated in the lower right corner of the display

Zoom Bar

The bottom most portion of the trace is a Zoom Bar. This represents the entire range of the trace being viewed. The green bar within the area represents the amount of the trace that is being viewed whiled the zoom function. While in Zoom level 1x the green bar will fill the zoom bar area meaning the entire range of the trace can be viewed and in Zoom level 2 the green bar will fill only half of the zoom bar area, meaning half of the entire range of the trace can be viewed. As the zoom levels increase, the green zoom bar will decrease in size to indicate the amount of the trace that can be views at one time. As a cursor is moved with the Scroll Wheel, the green zoom bar moves to indicate what portion of the trace is being seen. For example, if the green bar is to the left of the zoom Area, the beginning portion of the trace is being viewed and if the green bar is to the right of the zoom Area, the end of the trace is being viewed.

Cursor movement

The active cursor is shown as a solid line while the inactive cursor is a dashed line. When in the Menu mode an “A” or “B” will be displayed next to the Cursor soft key as in indication Press the A/B button to toggle between the cursors. When in the Menu mode, pressing select while the Cursor soft key is highlighted will also toggle the active cursor.

Cursor Lock

The cursors may be lock for accurate measurements. To lock the cursors press the Menu button, scroll to the Tools icon and press the Select button. Scroll to the Cursor Lock icon and press Select to toggle the lock cursor mode on and off. In the lock cursor mode, with the A cursor as the active cursor, both A and B cursors move and with the B cursor as the active cursor, the B cursor will move independently in order to set the distance between the two cursors.

Note

To quickly move the active cursor to the next event, press the Select button while the unit is in the trace view mode.

8.7 Unit of Measure

The distance unit of measure may be either displayed in Kilometer (Km), Kilo feet (Kf) or Mile(Mi). To change the setting, enter the menu mode, scroll to highlight the Tools icon and press the Select button. Scroll to Unit of Measure icon and use the Select button to toggle between Km, Kf or Mi. Press the Menu button to return to the trace display.

8.8 Loss Measurements

2 Point loss

2 Point loss method takes the difference in vertical height between where the A and B cursors cross the trace to determine the amount of loss in that section of fiber.

dB/Km

The dB/Km (dB/Kf) loss method takes the 2 Point loss in dB and divides by the distance between the cursors in Kilometers (Kilo feet). For accurate dB/Km (dB/Kf) loss measurements, the two cursors must be on level back-scatter points at least 100m apart (NA will be shown for distances that are too short).

Splice Loss

Splice Loss method is meant to be used in noisy environments when it is difficult to attain an LSA area that lays flat on the back scatter before and after the cursor. See section 7.8 - Setting Splice Loss Measurement Areas. This method takes an average of the selected points before and after the active cursor and uses this average to make a good estimation of the event loss. This is an estimation but this method may be more accurate than LSA Splice Loss method in noisy environments.

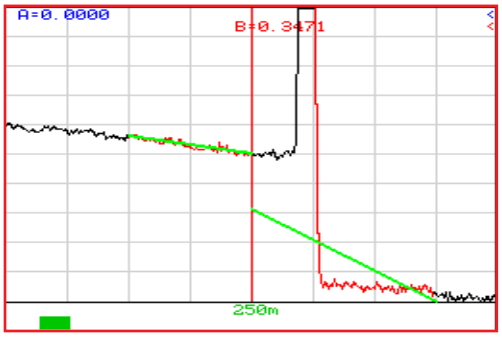
Least Squares Approximation (LSA)

Least Squares Approximation (LSA) Splice loss method gives the user a visual aid in setting splice loss areas. The splice loss lines must be set to overlay the backscatter of a trace without over lapping any other events. The LSA areas are set properly when the LSA visualization lines overlay the back scatter sections of the trace before and after the event. This method can be more accurate by affording the ability to see the slope of the splice loss areas, however: it can also supply a reading with greater error if not used properly. Please see section 8.9 for examples of setting LSA areas. In Noisy environments the LSA Lines will have an exaggerated movement making the Basic Splice Loss Measurement potentially more accurate.

8.9 Setting Splice Loss Measurement Areas

The splice loss measurement areas around the cursors are adjustable. This feature is used for both Basic Splice Loss and LSA Splice Loss. To access this feature, press the Menu button and scroll to the SPL icon. An arrow will be displayed above the point of the measurement area to be adjusted with the Scroll Wheel. There are three points that may be adjusted. The left hand most point of the measurement area before the cursor and the left or right hand point of the area after the cursor.

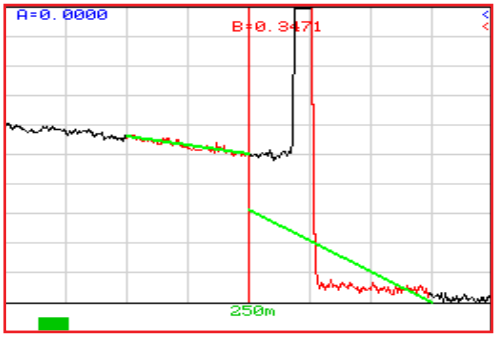
LSA Set Too Early



The LSA area and cursor are set too early. The right most green LSA indicator line is not over laying the back scatter of the trace properly

Fig 8.7

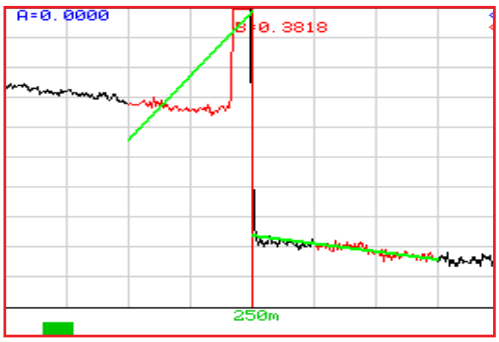
LSA Set Too Late



The LSA area and cursor are set too late. The left most green LSA indicator line is not over laying the back scatter of the trace

Fig 8.8

Proper LSA Setting



The LSA area and cursor are set properly. The green LSA indicator line is over laying the back scatter of the trace properly.

Fig 8.9

8.10 Quick Save/Recall

Quick Save

To use quick save, press the Menu button, scroll to the Save soft key and press the Select button. The trace will be saved to the storage location shown. The file will be stored with the same base file name as the last save stored trace. If the storage location indicated already contains a file, the user will be prompted to either “Over-write” the location, Save to the “Next” available location or “Cancel” the action. Scroll to the desired action and press Select. The storage location will increment accordingly.

> **Note**
> There are sample traces stored on the OTDR at the factory. These traces are saved in the with the base file name of default.

Quick Recall

To quickly recall a trace, press Menu, scroll to the Recall soft key and press the Select button to display the trace that is saved in the memory location indicated and the next memory location with a trace will be displayed.

9. 0 Event Analysis

NOTE

When using the event table, it is necessary to keep in mind that event analysis provides approximate loss and distance measurements to quickly assist in network evaluation. Automatic detection results are not guaranteed and have their limits, possibly causing erroneous readings or detection failure. User interaction by interfacing with the trace display is recommended for final qualitative and quantitative analysis.

9.1 Enter Event Analysis Mode

To open the event analysis table, press the Menu button, scroll to highlight Show Event soft key and press the Select button. Use the Scroll Wheel to move through the events. If the Select button is pressed while an event is highlighted, The OTDR will revert to the Trace Screen with the active cursor positioned at the selected event. An alternative method to return to the trace view is to press the Menu button, scroll to the Show Trace soft key and press the Select button.

9.2 Event Analysis Table

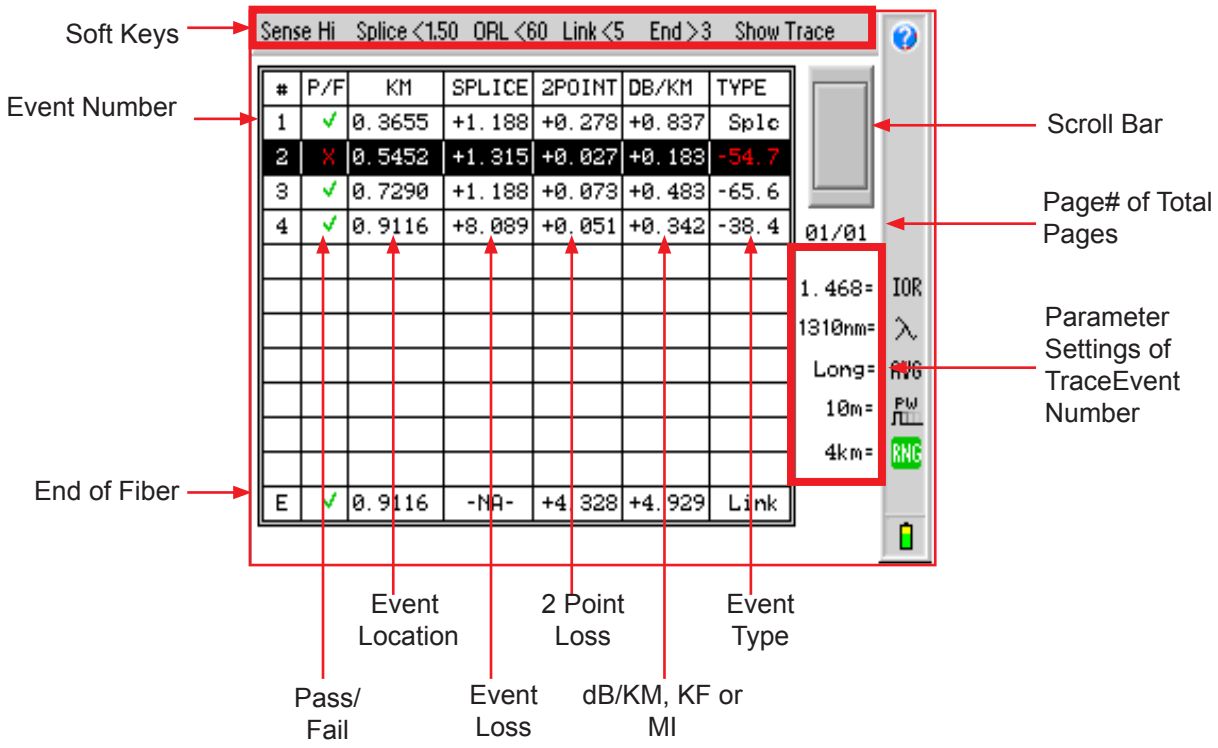


Fig 9.1

9.3 Field Descriptions

 # (Event Number)
Indicates the events in sequence, higher numbers are further distances from the OTDR. “E”, which is always displayed in the bottom row is the event determined to be the End of Fiber (EOF).

P/F (Pass/Fail)
Pass/Fail, if any one of the thresholds are not met for and event, the P/F column will display a red X. The parameter that failed will also be displayed in red. If all the parameters are met, a green check mark will be displayed.

KM (Event Location)
Event Location, Km for Kilometer or KF for Kilo-feet or Mi for Mile. This is the distance/location that the event occurs in the respective unit of measure.
Field Descriptions (Continued)

SPLICE (Event Loss)
Event Loss, where a positive number is the amount of loss and a negative number would be indicating a gain. This is a settable threshold for the Pass/Fail feature.

2POINT (2 Point Loss)
Point Loss, which is measured from the end of the dead zone of the previous event to the beginning of current event.

DB/KM (dB Loss Per Km/Kf)
dB per Kilometer if in KM unit of measure and DB/KF if in Kilo-Feet unit of measure. This is the calculated loss per Km or Kf from the end of the dead zone of the previous event to the beginning of the current event.

TYPE (Event Type/ORL)
Event Type is the type of event or the ORL measurement. If the event is no reflection, “splc” will be displayed and if the event contains a reflection, the ORL value will be displayed. This is a settable threshold for the Pass/Fail feature

E (End Event)
The bottom row of the table is the loss and distance information as it pertains to the entire fiber link. KM column is the end of fiber distance measurement, Splice column is not used, 2 Point is the measurement from the origin (OTDR) to the determined end of fiber in the KM column. The dB/km column is that measurement for the entire link and in the Type column Link will be displayed.

9.4 Event Sensitivity Level

There are three levels of sensitivity while in the event table. The sensitivity is set via the Sense soft key. Press the Menu button and Scroll Wheel to highlight the Sense key. Press the Select button to cycle through “Lo” (Low) for event with loss as low as approximately 0.5dB, “Me” (Medium) with events with loss down to approximately 0.2dB and “Hi”, for events with loss as low as approximately 0.1dB. Medium and High sensitivity settings should be used for high signal level, low noise, long pulse, averaged traces.

9.5 Pass/Fail Settings

Splice, ORL and Link are all settable thresholds for Pass/Fail purposes. To set the thresholds, press the Menu button, scroll to highlight the desired soft key, press the Select button and use the Scroll Wheel to reach the desired value. Press Select button again to lock in the settings. If the trace fails any of the three thresholds, a red X will be displayed in the P/F column and the suspect threshold value will be displayed in red.

Examples:

Splice: If a splice needs to be less then 1dB, set the threshold to <1.0.
If 1.0 would be accepted, set threshold to 1.01db.

ORL: If an ORL needs to be less then -50dB, set the threshold to <50.
If 50dB is acceptable, set the threshold to <49.

Link: If the link loss needs to be less then 20dB, set the threshold to <20.
If 20db link loss is acceptable set the threshold to <21.

End: This threshold setting is the first test to determine the end of fiber. If set to 3dB, the first event that meets this threshold will be identified as the end of fiber.

To return to trace view, press the Menu button, scroll to the Show Trace soft key and press the Select button.

Chapter 10 File Management

10.0 File Management

10.1 Display

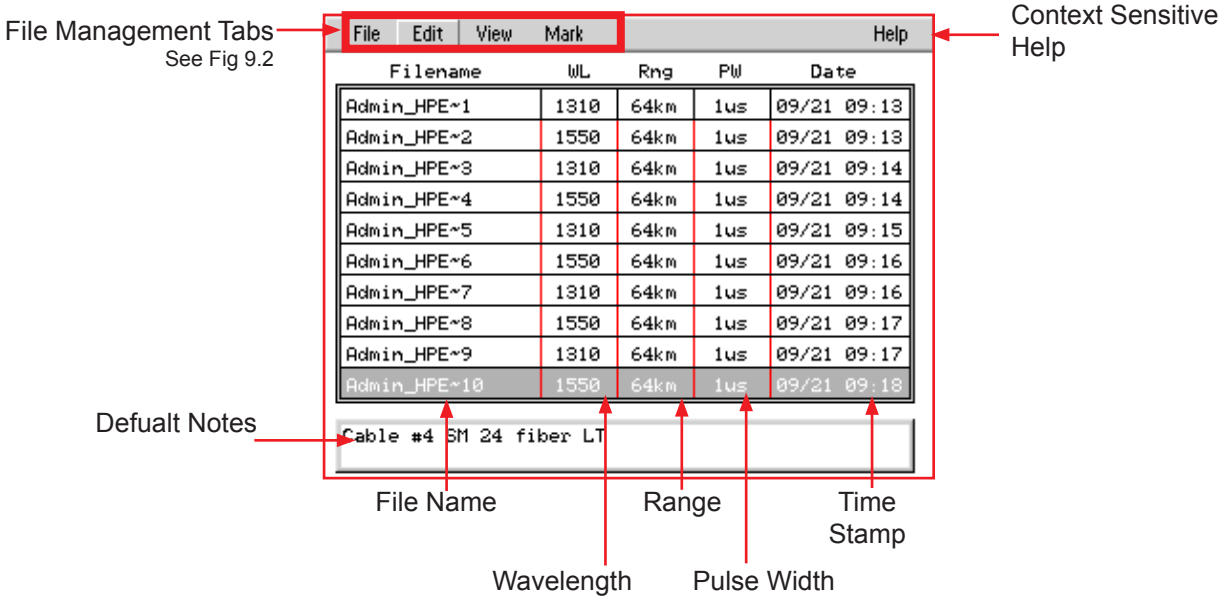


Fig 10.1

File Management Drop Down Menus

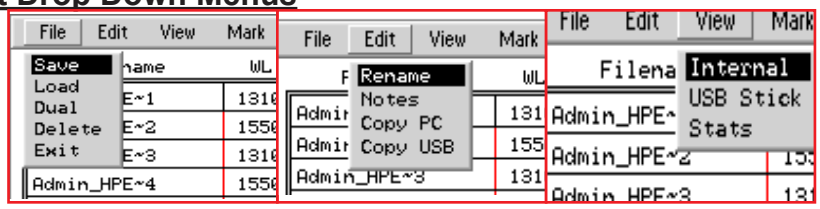


Fig 10.2

10.2 Entering/Exiting File Management

Press the Menu button, scroll to highlight the TRC (Disc) icon and press the Select button. For each test/file saved, an indication of wavelength, range, pulse width and a time stamp are stored. The file name can have up to 16 characters using the following; 0-9, A-Z, a-z, _ (underscore) or blank. To close the File Management System, press the Menu button, scroll to highlight the File Tab, scroll to Exit and press Select.

10.3 Saving a Trace

There are two methods to save traces. The first is the Quick Save method described in section 8.10 The second method is to enter file management with a trace on the display, press the Menu button, scroll to the File Management icon and press Select. Press the Menu button to the shift the focus of the scroll wheel to the file management tabs. Highlight the File tab, press Select and with Save highlighted in the dropdown menu, press select again. Use the scroll wheel to change the highlighted character. With the desired character displayed, press Select to enter that character and the next character will be highlighted. Continue until the desired file name is entered and press the Menu button. Use the scroll wheel to highlight Cancel, Redo or Save and press Select.

10.4 Renaming a Trace

Highlight the file to be renamed using the scroll wheel. Press the Menu button and scroll to highlight the Edit tab. Press Select and with Rename highlighted in the dropdown menu, press select again. To leave a character unchanged, simply press Select on the highlighted character. To change a character, use the scroll wheel to make the change and press select with the desired character displayed. Continue until the name is entered, press the Menu button, scroll to select Save Changes or Discard Changes, and press Select.

10.5 Viewing Saved Trace

To view a saved trace from internal memory, use the scroll wheel to highlight the desired trace and press the Select button. The OTDR will revert to the trace view with the selected trace displayed and directly below the trace will be the trace name. “Load” located in the File dropdown menu may also be used to load a trace to the trace screen. With the desired trace highlighted, press menu, scroll to the File tab, press select, use the scroll wheel to highlight Load and press Select.

10.6 Dual Trace

Note

To compare two traces, they must have the same range and resolution settings.

With a trace on the display, enter the file management, highlight the trace to be placed in the background, press the Menu button, scroll to the File tab highlighted, press Select, scroll to Dual on the dropdown menu and press select again. Both traces will now be displayed. The primary or first trace loaded is the black trace and the secondary trace is the green trace. All values displayed are the values associated with the primary trace. If the trace for the background does not have the same range or resolution as the main trace, a range mismatch message will be displayed. Press the Select button to clear the message.

To exit the Dual Trace mode, start a new scan or open a new main trace from file management.

10.7 Marking Traces for Mass Coping and Deleting

Scroll to highlight the first trace to be copied or deleted. Press the Menu button, scroll to the Mark tab and press Select. To mark 1 or 2 files for mass copying, press the Select button and the highlighted trace will be displayed in red font. Pressing select again will mark the highlighted trace and the next trace will be highlighted. (The highlighted file is not marked.) Only those files in displayed in red are marked. To mark a large number of files use the scroll wheel. Scrolling down (clockwise) will mark a file and scrolling up (counter clockwise) will un-mark a file. Files may be skipped by shuPROng off the marking feature, scrolling ahead and turning the feature back on. To do this, once the last trace of a section has been marked, press the Menu button, scroll to the next file to be marked, press Menu again, press Select or scroll to continue marking the files. Once all the desired traces are marked they may be deleted or copied as necessary.

10.8 Copying Traces

NOTE

Limit flash drives to 4 gigabytes. It is suggested that new flash drive sticks be tested prior to use. Save traces to the flash drive from the OTDR and test them on the computer with the supplied software to ensure they operate properly.

NOTE

Do Not Remove USB Flash Device While The OTDR Attempts To Read Or Write To That Port.

Traces may be copied to the USB flash drive or to a PC for use with the certification software. The Certification Software is required to copy trace files to a computer through the USB/PC Port. With a trace highlighted or a group of traces marked, press the Menu button and scroll to the Edit tab, press Select, chose either Copy PC or Copy USB from the dropdown menu and press select.

10.9 Deleting Traces

Traces may be deleted from the internal memory or USB flash drive. With a trace highlighted or group of trace marked, press the Menu button, scroll to the file tab, choose Delete from the dropdown menu with the scroll wheel and press Select. Use the scroll wheel to highlight Cancel or Confirm Delete and press Select.

9.10 Adding Default Notes

A note may be saved with a trace. With a file highlighted, entering a note will save that note for that one trace. With an empty file storage position highlighted, enter a note and this note will be stored with all traces until the note is changed or deleted. To enter notes, while in the file management screen, press the Menu button, scroll to the Edit tab and press Select. Use the scroll wheel to choose Notes from the dropdown menu and press Select. The first character of the notes field will be highlighted. Use the scroll wheel to choose a character and press Select. To erase a character or enter a space, scroll back to the “blank” which is the first character available. If a mistake is made, it may be best to exit the Note field by pressing the Menu button, and reenter the notes field from the Edit dropdown. Once you have completed the note, press Menu to exit.

10.10 Accessing Flash Drive

To access the flash drive, while in file management, press the Menu Button and scroll to the View tab, press Select and choose USB Stick from the dropdown menu. To return to the internal memory, press the Menu button, return to the View dropdown and choose Internal. All of the Tab functions available for the internal memory are also available for the Flash drive.

10.11 Internal Memory Statistics

The amount of storage available in the onboard memory is found in the Internal Memory Statistics screen. To view this screen; while in file management, press Menu, scroll to the View tab and select Stats from the dropdown menu. This will indicate the percentage of memory used and how many more traces of a specific range may be saved.

Chapter 11 Loss Test Set Description

11.0 Loss Test Set Description

11.1 Entering Loss Test Set Mode

The LTS application is entered from the Home Menu. Use the Scroll Wheel to highlight the LTS application Tab and press Select. From the OTDR application, press the Menu button, scroll to the Exit Icon and press Select to return to the Home Menu. When in the Scope application, Press the Menu button, scroll to highlight the Return soft key and press Select to return to the Home Menu.

11.2 Key Pad Operation

Fig 11.1

Power button, turns the unit on and off.

Scan — Resets any temporarily memory values before they have been stored with the select button.

AutoTest — Starts the Auto Test function. The light source will be turned on and cycle through the wavelengths selected with the λ icon.

Menu — Toggles between the Test mode and the Menu mode where the focus of the Scroll Wheel and the Select Button are on the soft keys and icons.

A/B — Cycles through the power meter wavelengths selected with the λ Icon. When in the File Selection Screen this key will toggle through save values for a particular storage position.

Zoom — Changes the display to the zoom screen where all stored test for a memory location are display. There can be up to 4 test stored per location.

select — The Select Button will store all measurements in the temporary memory to the storage position shown the lower left corner of the display while in the Test Mode and while in the Menu mode it will activate an icon item or soft key.

The scroll wheel is only used when in menu mode while in Live Scan mode. When in File View mode, it is used to move through soft keys and icons in Menu mode and scrolls though the stored file when not in menu mode.

11.3 LTS Displays

LTS Live Scan Mode

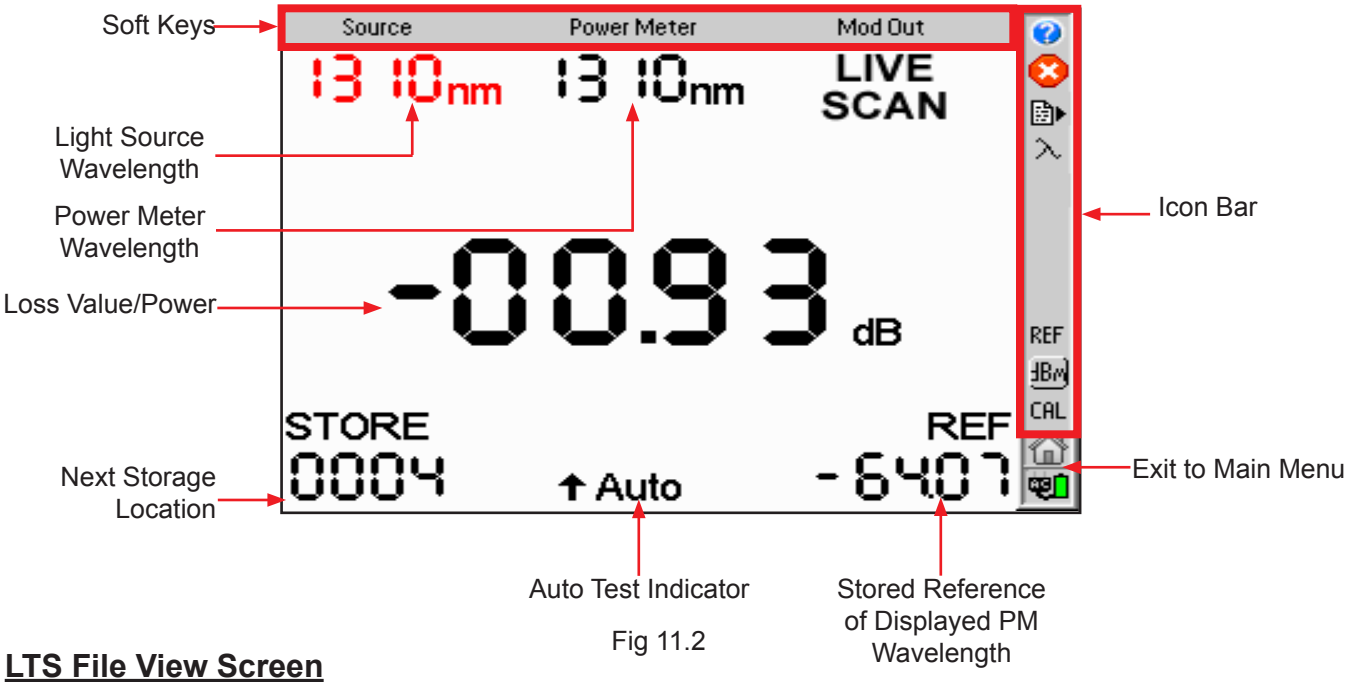


Fig 11.2

LTS File View Screen

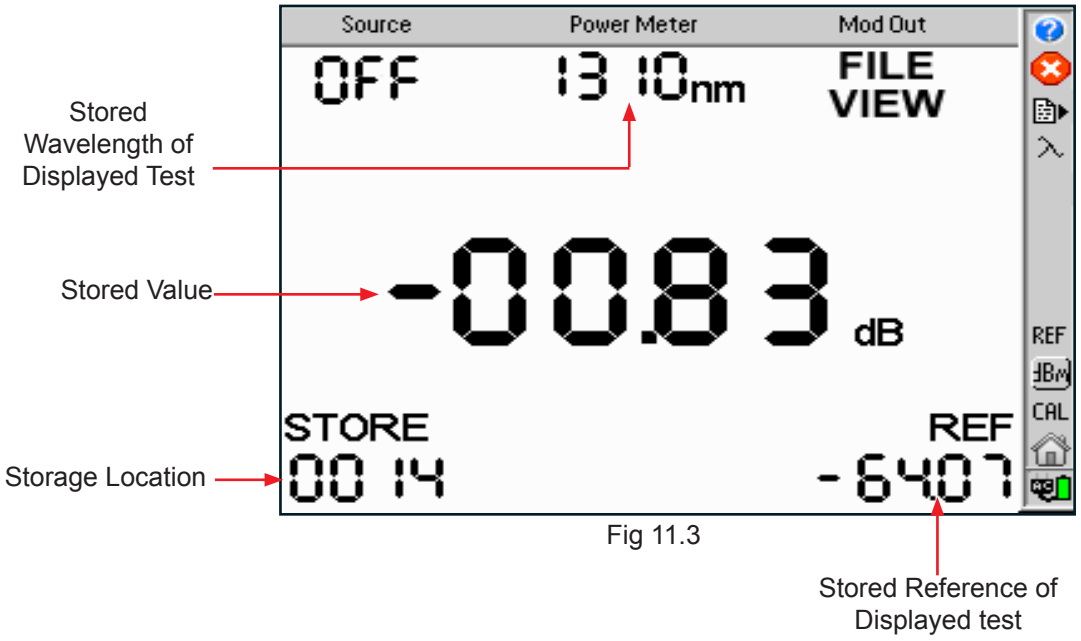


Fig 11.3

11.4 LTS Soft Key Operation

Source
Enter the Menu mode and scroll to highlight the Source soft key. Press the Select button to cycle through the available wavelengths. (See Lambda/wavelength icon information below) The displayed source wavelength is the active source. Turn off all sources, by cycling to the “Off” position.

Power Meter
Enter the Menu mode and scroll to highlight the Power Meter soft key. Press the Select button to cycle through the available wavelengths. (See Lambda/wavelength icon information below)

Mode
Enter the Menu mode and scroll to highlight the Mode soft key. Press the Select button to toggle between the Live Scan mode and File View mode.

11.5 Loss Test Set Icon List

Help
The Loss Test Set has an onboard help feature. To access the help feature, enter the Menu, use the scroll wheel to highlight the Question Mark Icon and press the Select button. Scroll to the desired topic and press the Select button. Press the Menu button again to exit the help feature.

Delete
Deleting a stored loss measurement is accomplished in the File Selector mode. (See LTS File Selector operation, Section 11.4) To delete a measurement/s from a single memory location, while in the File Selector, select the desired test to be deleted, press menu scroll to the Delete icon and press select

> **Note**
> There is not warning or confirmation necessary to delete one memory location.

To delete the all the memory locations at one time, follow the procedure above, however do so on and empty location. When the Delete icon is select on the empty location, a Confirm dialog with “Delete all files?” will be displayed and the option to Delete or Cancel the action. Press the Select button with the desired action high-lighted.

> **Note**
> A loss measurement of (----) is not empty if there is a wavelength displayed to the right. That would be a null measurement). An empty location is (----) with no wavelength displayed to the right.

Measurements may also be deleted in the Quick File Locator. With the storage location selected, press the Menu button, scroll to the Delete icon and press Select. There is a time out on the Quick File Select. If the display reverts to the test mode, before the delete button is selected, the file will not be deleted.

Lambda (Wavelength Selection)

Highlighting and selecting the λ Icon will display the Wavelength Selection menu. Use the scroll wheel to highlight the wavelengths to be select for use with the light source and power meter and press the Select button to toggle them off and on. The selected wavelengths will be the only wavelengths tested auto test and the only ones available when cycling through the light source and power meter soft keys. Highlight “Save Selection” at the bottom of the menu and press the Select button to save the setting and return to the Loss Lest Set mode.

File Download

File Download is used to send the save Loss Test to a PC. Once the PRO-CW8-SM35A is connected to a computer with the certification software running, enter the menu mode and highlight the File Download icon. When directed to do so, press the Select button to immediately start a download to the computer via the USB cable. Press the Menu button to return to the test mode.

Set Reference

This icon is used to set the reference for relative loss measurements.

dBm/dB

This icon is used to toggle the power meter from absolute power referenced by dBm and relative power referenced by dB.

Calibration CAL

This tool is for factory use only.

Exiting Applications

Press the Menu button, scroll to the Home icon and press Select.

12.0 Loss Test Set Operation

12.1 Power Meter Measurements

Power Measurements

With the PRO-CW8-SM35 in Live Scan, connect the fiber carrying the optical power to be measured to the Power Meter detector utilizing the appropriate adaptor. Select the power meter wavelength that matches the wavelength of the light being measured. The power reading will now indicate the optical power in units of dBm. The power will display an out-of-range condition indicated by a series of four dashes on the display if the signal is greater than +5 or less than -77 dBm. CATV versions are available upon request.

To save the power measurement to the storage location indicated below the STORE label press the Select button. The memory location will auto increment to the next available memory location.

Relative Measurements

To make a relative power measurement you must first save the reference power level. To store a reference level, attach reference cord/s and energize the light source. Enter the Menu mode, scroll to Ref icon and press the Select button. The reference is now stored in nonvolatile memory and displayed at the bottom right of the display. The units of the display will now change to dB. Subsequent readings will now be displayed in terms of dB relative to the stored reference value. A reference memory location is available for each selected wavelength. A reference reading is required to change to dB measurement from dBm measurements.

Remove the connector from the power meter port and place the fiber under test inline between the reference cord and the power meter port. The reading displayed will be the loss of the fiber under test relative to the reference. Ensure the unit is not in Menu mode and press the Select button to store the measurement.

Stored power measurements may be recalled by moving the Scroll Wheel and the File Selector Screen will be displayed. If no buttons are press for 5 seconds after entering the File Selector mode, the unit will revert to the test mode. The Scan button may also be pressed to re-enter test mode.

12.2 Autotest Mode

To use the Auto Test feature, connect the fiber to be tested to a compatible test set. The unit being used as the source should be set to Autotest. If Two Quad OTDRs are being used, only the wavelengths to be tested should be selected as sources by entering the Wavelength/Lambda selection menu. Only the wavelengths that are energized will be displayed on the power meter end. Once the source and power meter have cycled through the wavelengths to be tested, press the Select button on power meter to store the measurements. .

Note: A reference measurement is not used in the Auto Test Mode. The Source is modulated and has power level of -3dBm (-6dBm@1625). This method of measurement does not take into account the launch condition, thus the manual method of testing should be used when highly accurate measurements are required such as when testing the loss of an individual connector. The Auto Test annunciator will be displayed during Auto Test loss measurements. Two or more loss measurements are best viewed in the Zoom mode where all the selected wavelengths will be display at one time on the display.

12.3 Light Source Operation

The lasers are initially in the off state when the LTS is launched. Enter the Menu mode and use the Scroll Wheel to highlight the Source soft key. Pressing Select will energize the available wavelengths in sequence.

12.4 File View

Enter the File View by pressing the Menu button, scrolling to the Mode soft key and pressing Select. Press Menu to exit the Menu mode. Use the scroll wheel to scroll through the stored traces. The Store location in the bottom left of the screen will be changed to VIEW location. The value shown is the data stored in the displayed file location. To exit the File View press the Menu button, scroll to the Mode soft key and press select.

12.5 File Transfer

To transfer files from the Loss Test Set to the computer, start the certification software. Connect the OTDR to the computer with the supplied USB cable, Select Loss Test Set from the applications tabs. To start the memory download, enter Menu mode on the OTDR, highlight the File Download Icon and press Select. The download progress will be indicated by the UPLOAD counter in the bottom left corner of the LTS display and in the top right corner of the software screen.

Chapter 13 Channel Analyzer Operation

13.0 Channel Analyzer Operation

13.1 Key Pad Operation

Power button turns the unit On and Off.
(Hold for 1 second)

Scan button starts or stop a scan, and resets the table of data.

This button is disabled for 8 Channel CWDM Channel Analyzer.

Fig 13.1

Menu toggles the focus of the Scroll Wheel between the Scan Mode and the Menu Mode. In Scan mode the focus of the Scroll Wheel and the Select Button are on the active cursor. In Menu Mode, the Scroll Wheel moves through the Soft Key Menu and the Side Icon Bar.

Toggles between “A” and “B” as the active cursors.

This button is disabled for 8 Channel CWDM Channel Analyzer.

The Select button actuates the highlighted item.

While in Scan Mode, the scroll wheel moves the cursors. While in Menu Mode, the scroll wheel is used to move through the soft keys and icons.

13.2 Channel Analyzer Display

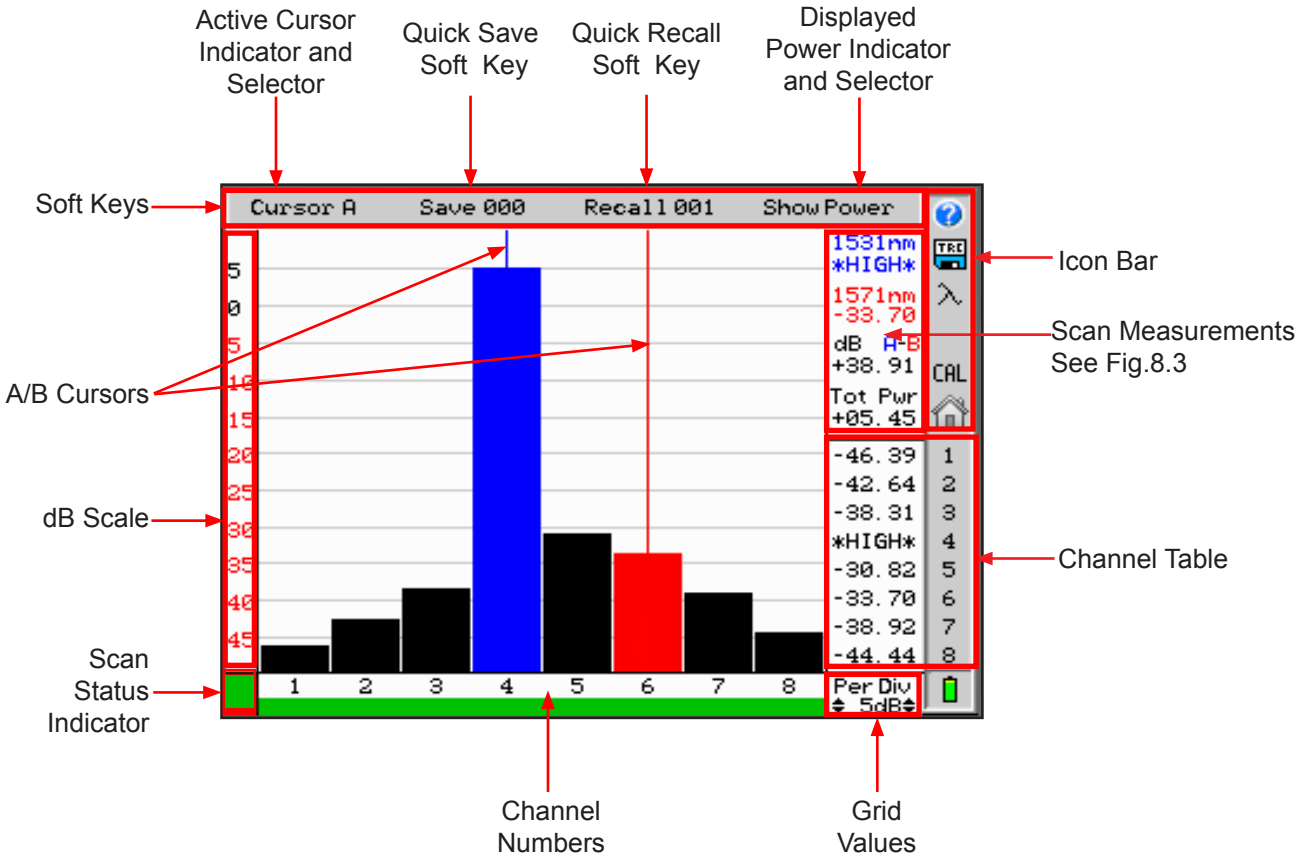


Fig 13.2

Displayed Scan Measurements

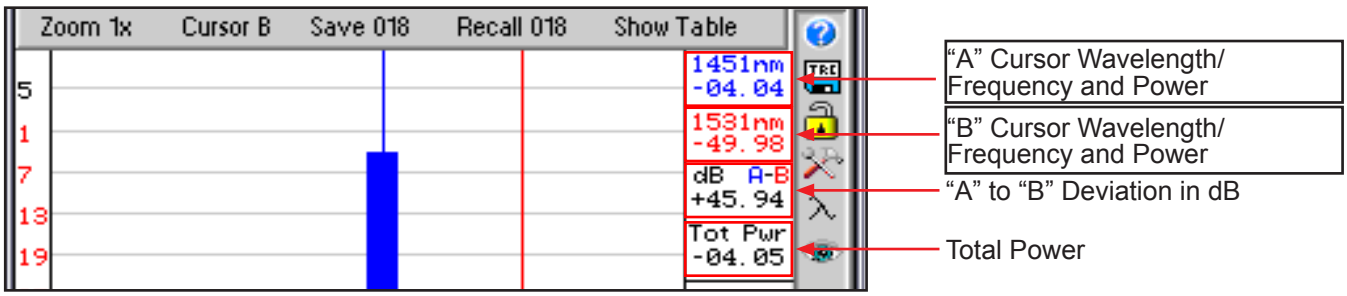


Fig 13.3

13.3 Enter Channel Analyzer Function

Enter the CWDM Channel Analyzer operation from the home screen by using the scroll wheel to highlight the OSA icon and press Select.

Warning

Care should be taken as skin or eye damage could result from high power devices such as transmitters or EDFAs.

Caution

The PRO-CW8-SM35 Channel Analyzer is designed to test a total power of 23dBm. Attempting to test a total power above 23dBm will cause damage to this instrument.

Caution

Fiber-optic connectors are easily contaminated or damaged. The connection to the PRO-CW8-SM35 is a physical contact type of connection and dirty or damaged connectors may impair the instruments capabilities at minimum and at worst result in the need to return the PRO-CW8-SM35 to the factory for expensive repairs. Prior to making any connection to the unit, ensure that all proper cleaning procedures have been followed. Use UPC Finish Connectors Only!

Start a Scan

Ensure the connector to be inserted into the optical port of the channel analyzer is clean and not damaged. Insert the connector and press the Scan button to start a scan.

The wavelength/frequency and power are shown at the top right corner of the display in blue for the “A” cursor and red for the “B” cursor. Just below the power reading for the cursors is the deviation between the power levels of the channels selected by the cursors and below that is the total power measurement. Refer to Figure 13.3. Total power is the power that is present on the fiber. The total power measurement is displayed in dBm.

13.4 Channel AnalyzerTable

The table located in the bottom right of the display indicates power levels for the 8 CWDM channels, listed 1-8 with 1471nm being number one and 1611nm being number eight. The power level displayed is controlled by the Power soft key at the top right of the display. There are four options when displaying power. Show Power indicates the real time power of each channel. There are also Show Min, Show Max and Show Avg options. To select the desired power level to be show, press the Menu button, scroll to the Show XXX soft key and press Select to cycle through the four choices. These measurements are real time and accumulated during the length of a scan.

13.5 Unit of Measure

The units of measure are wavelength or frequency. The Lambda icon is used to change the unit of measure between nanometers or terahertz. This will change the A-B span measurement to the left of the λ icon and the measurements displayed for each cursor. To change the unit of measure, enter the menu mode by pressing the Menu button and scrolling to the Lambda icon. Once highlighted, pressing the Select button will toggle between nanometers or terahertz. Press the Menu button again to return to the Scan Mode.

13.6 Quick Save/Recall

A scan may easily be stored to memory by using the Save soft key. To do this, enter the menu mode, scroll to the Save soft key and press the Select button. The scan will be saved to the location indicated. If that storage position is full, a dialog will be displayed with the options of overwriting the file, storing to the next available location or canceling the command. Use the scroll wheel to highlight the desired action and press Select. The action will be complete and the display will return to the scan mode.

Any file saved with this method will use the base file name of the last manually entered file and increments the suffix by one.

To use the quick Recall feature, enter the menu mode and scroll to the Recall soft key. Pressing the Select button will recall the scan stored in the indicated storage location. Continued selecting of recall will cycle through any stored scans and when the last stored scan is reached, continued selection will start back at the first occupied storage location. Press the Menu button to return to the scan mode.

Chapter 14 Channel Analyzer File Management

14.0 File Management

The OSA has the capability to store up to 1000 scans. Once stored, these files may be copied to a PC via a USB cable or copied to a USB flash drive. To enter file management, press the Menu button, scroll to the File Management icon and press the select button. The files are listed in order of file storage position with an xxxxxxxx.OSA (8.3) naming convention. Use the Scroll Wheel to move from one stored scan to another. As a file is highlighted the time and date stamp are displayed with total and peak power information and the number of channels measured. There is also a preview map of the scan displayed.

14.1 File Management Display

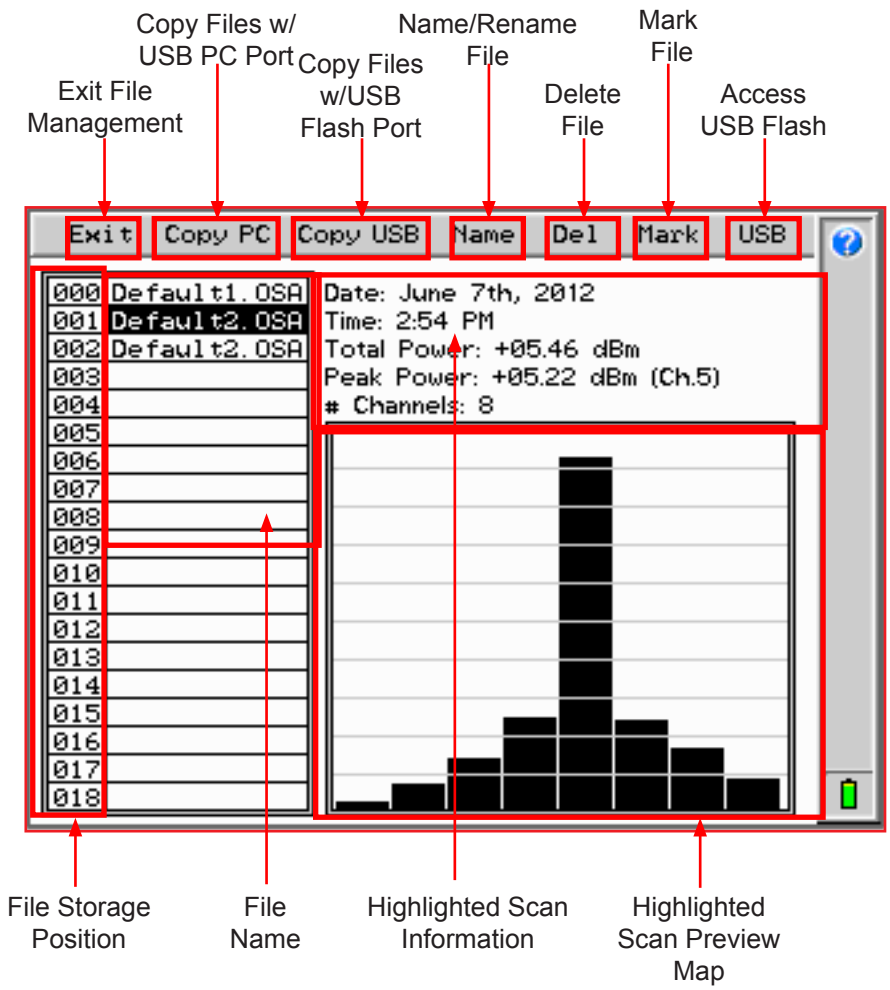


Fig 14.1

14.2 Viewing a Store Scan

To view a scan that has been stored in the file management area, press the select button while the desired file is highlighted and the file will open in the scan mode.

14.3 File Management Soft Key Functions

Exit File Management

There are two methods to return to the scan screen from the file management area. First is to enter the menu mode, scroll to the Exit soft key and press select. The second is to press select while a file is highlighted, this will open the scan screen with the highlighted file displayed.

Copying Files to a Personal Computer

With the use of the supplied certification software and USB cable the stored files may be copied directly to a PC. Highlight or Mark (see Marking Files on the next page) the desired file/s to be copied and scroll to the Copy PC soft key. Press Select to move the files to the computer when directed to do so in the certification software.

Copying Files to Flash Drive

To Copy files to a flash drive, insert a flash drive (not to exceed 4Gbits in capacity) into the flash drive port. Highlight or Mark (see Marking Files on the next page) the desired file/s to be copied and scroll to the Copy USB soft key. Press Select to copy the files to the root directory of the flash drive.

Naming a File

The Name soft key may be used to name a file for a new scan to be saved or to rename a currently stored file. Files stored with the Save soft key will take the base name of the last named file. To start a new set of scans with a new base file name, enter the menu mode while the first scan is displayed. Scroll to the desired storage location for the first scan of the project. Press the Menu button, scroll to the Name soft key and press Select. The storage location will display a black box with a .OSA extension. Use the Scroll Wheel to cycle through the available characters. The available characters are (space), 0-9, A-Z and a-z. Press Select to enter the character and move to the next character. Once the desire file name is in place, press the Menu button and “Save Changes or Discard Changes” will be displayed in the soft key bar. Scroll to highlight Save Changes and press the Select button to complete the action.

Note

The file name is formatted as xxxxxxxx.OSA (8.3) style. The file storage system uses the eighth, seventh then the sixth position to make the file name unique with an identifier digit. Therefore depending on how many files need to be saved for the group of test, it may be best to only use 5, 6 or 7 characters for the file name. For example: If a file name of bbbbbbb.OSA was give to the first scan, when the following scans are saved they will be named; bbbbbbb0.OSA , bbbbbbb1.OSA, bbbbbbb2.OSA and so on. In this case if there were more then eleven scans, the next name would be bbbbbb10.OSA. The name would be adjusted to accommodate the two digit identifier. With the storage capability of up to 1000 scans, the identifier could possibly use up to three positions. It is suggested that this be taken into consideration when creating the base file name.

Renaming a File

To rename a file, highlight the file to be renamed, press the Menu button and scroll to the Name soft key. Press select and the first character of the file name will be highlighted. Continue to name the file as described earlier, press menu when done to either save changes or discard changes.

Deleting Files

To delete files, Highlight the file or Mark files (see Marking Files below) to be deleted. Press the Menu button and scroll to the Del soft key. Press select and “Cancel or Confirm” delete will be displayed in the soft key bar. Use the scroll wheel to highlight the desired action and press Select.

Marking Files

Mass Copying and deleting can be accomplished with the Mark soft Key. Highlight the first file to be copied or deleted, press the Menu button, scroll to the Mark soft key and press Select. Use the scroll wheel to move through the files. Moving clockwise marks any files that are passed and move counter clockwise un-marks any files that are passed. Marked files will be displayed in red. Press the menu button again and select the desired soft key function to be completed.

Viewing Scans from a USB Flash Drive

The PRO-CW8-SM35 can view files from a USB Flash drive. Insert the USB Flash drive into the proper port and enter the menu mode. Scroll to highlight the USB soft key and press the Select button. The PRO-CW8-SM35 will read any .OSA files in the root directory of the flash drive. Highlight the file to be viewed and press the Select button. To exit the flash drive directory, press the Select button a second time while the USB soft key is highlighted and the focus will revert back to the on board file management system.

Chapter 15 Video Scope Operation

15.0 Video Scope

The PRO-CW8-SM35 can accommodate PRO Video Probe. Located on the bottom panel is a an 8pin DIN connector labeled “Vid Probe” The PRO-CW8-SM35 can view a connector end face, center the image and zoom from 200X to 400X. This feature is accessed from the Home screen.

15.1 Video Scope Display

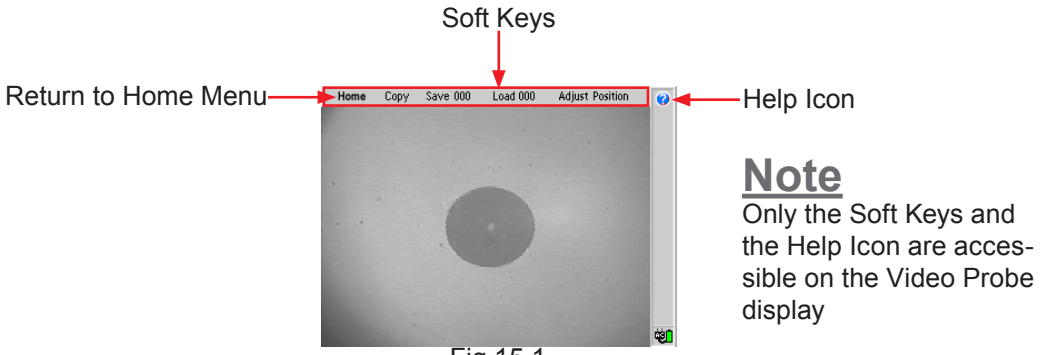


Fig 15.1

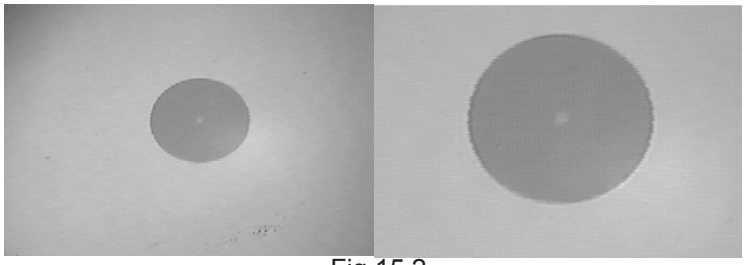


Fig 15.2

15.2 Video Scope Operation

From startup, scroll to highlight the Scope icon and press select. If the instrument is in another application, press the Menu button, scroll to the Home or Exit icon and press Select to return to the Home screen. Insert the probe and turn on the probe light by moving the switch on the probe to the right. The LED will illuminate indicating the probe light is on. Insert a connector to the probe or insert the probe into a fiber adapters and focus. Use the thumb wheel to focus the image. To zoom to 400X, press the Zoom button. Pressing the Zoom button again will revert back to 200x.

15.3 Video Scope Soft Keys

To access the Soft Keys, press the Menu button and use the scroll wheel to highlight the desired Key.

Home
Used to return to the Home Screen

Copy
To copy or delete images, Press the Menu button and scroll to the Copy soft key. Pressing select on the soft key will display a dialog that offers the option of coping all of the images to the PC via the USB/PC port or to a flash drive. The dialog will also offer the option to delete all the stored video files or cancel the process. Scroll to the desired action and press the Select button.

> **Note**
> Do Not Remove USB Flash Drive While Accessing.

Save
The Video image may be saved as a Bitmap by pressing the Menu button, scrolling to the Save soft key and pressing the Select button. This will attempt to save the image to the location displayed next to the Save soft key. If that location is occupied by a stored image, a dialog will appear with the choice to overwrite that location, save to the next available location or cancel the process. Scroll to the desired action and press the Select button.

Recall
To view a stored image, scroll to the Load soft key and press select to view the image at the indicated location. Subsequent presses of the Select button will increment through the occupied storage locations.

Adjust Position/Adjust Contrast
This soft key is a toggle between adjust Positon and Adjust Contrast. With Adjust Position soft key is shown, the image may be centered by use of the scroll wheel when in the 400X zoom setting. For positioning, use the scroll wheel as a left-right-up-down feature by pressing those areas of the wheel. With Adjust Contrast soft displayed, the scroll wheel will change the contrast of the image.

Chapter 16 Visible Fault Locator

16.0 Visible Fault Locator (VFL)

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WARNING

Never clean or look directly into the fiber optic connector or the end of fiber attached to the OTDR or VFL unit while they are energized, to do so will expose the user to laser radiation and could result in personal injury or instrument damage.

16.1 VFL Description

Visible Fault Locator Description

The Visible Fault Locator (VFL) is a stabilized fiber optic laser source that emits visible (red) light at 650nm. Its intended function is to allow an operator to identify fibers or find the exact location of a break, micro bend, or other discontinuity in a fiber optic cable. As the radiation is visible, light emanating from a break or micro bend enables the user to locate the exact position of a fault even at very short distances that would not be detectable by other means. It is also useful for identifying a particular fiber in a cable by exciting the fiber to be located with visible radiation.

16.2 VFL Operation

Visible Fault Locator Operation

This feature is accessed from the Home screen. From startup, scroll to highlight the VFL icon and press select to cycle through VFL through CW (constant wave) mode or MOD (modulated) mode and Off. If the instrument is in OTDR or LTS mode, press the Menu button, scroll to the Exit icon and press Select to return to the Home screen. When in the Video Probe mode scroll to the Exit soft key and press Select to return to the home screen.

Note

When in the OTDR application and the VFL is required, the active trace will not be lost by exiting to the home menu.

Chapter 17 Maintenance

17.0 Maintenance

17.1 Battery Replacement

Battery replacement is not recommended; however, if you must replace the batteries, follow this procedure. Unplug external power supply and ensure the unit is turned off. Carefully remove unit from protective boot and remove the two screws from top plate and bottom plates that retain the back cover. Carefully remove back cover and remove the two screws that hold the battery covers in place. Replace only with 8 high quality AA NiMH batteries. Do not use batteries that are rated at less the 2500mAh. If you install NiMH batteries that are dead or less than 1 volt each, charge these batteries for one (1) hour before using this unit.

Warning

To Prevent Fire or Shock Hazard:

- Do not install battery types other than those specified by the manufacturer
- Do not use the charger without the batteries installed
- Do not expose the battery charger to rain or excessive moisture
- Do not use the AC adapter when there are signs of damage to the enclosure or cord
- Ensure that you are using the correct charger for the local line voltage
- Do not use any other charger than the one provided with this instrument.

Failure to follow these caution statements may void the warranty of this equipment.

Note

For maintenance, batteries require a monthly recharge.

17.2 Calibration and Verification

Periodic verification of the PRO-CW8-SM35 is recommended to ensure that your instrument remains within specification. Although not imperative, we recommend a calibration and verification once a year to make certain the instrument is functioning properly and performing to its rated specifications. Consult the factory for service.

17.3 Adapter Replacement

The PRO-CW8-SM35 is supplied with two easily interchangeable adapters per port, SC/FC. To change an adapter, remove the two screws that hold the adapter in place, pull the adapter straight up from ferrule. It is suggested that you clean the exposed ferrule with appropriate cleanser and lint free wipe anytime you replace the ferrule.

Note

In order to maintain a low loss fiber connection, care should be taken to adequately clean the ferrule of any connector to be connected to the OSA. In the event that the port needs to be cleaned, first step is to be certain the instrument is off. We suggest the use of isopropyl alcohol and foam swabs specifically designed for cleaning connectors accepting 2.5mm ferrules.

Note

When replacing the adapter with one that does not have a chained protective cap, use the small screw in place of the larger screw that retains the end of the chain to the adapter base.

Chapter 18 Specifications

Specifications			
OTDR		**CWDM Channel Analyzer**	
Wavelength	1310/1550 nm	Wavelength Range	1471-1611nm
Dynamic Range	36/34dB SM,	Channel Spacing	20nm
Pulse Width	5 - 20,000 ns	Channel Pass Band	±6.5nm
Units of Measurement	km, kf, mi	Channel Power Range	+5dBm to -50dBm
Event Dead zone	1m	Absolute Accuracy	±1 dB
Attenuation Dead Zone	4m	Max Composite Power	+23dBm
Resolution	.125 - 32m	PDL	±0.2dB
Distance Uncertainty	±(0.75m + 0.005% x distance + sampling resolution)	Adjacent Channel Isolation	30dB
Full Scale Distance Range	1-240km SM	Measurement Time	< 1/2 Second
Typical Real-time Refresh Rate	2 Hz	Readout Resolution	0.01dB
Group Index of Refraction (GIR)	1.024 - 2.048	Return Loss	>40dB
Linearity	± .05 dB/dB	Optical Interface	Universal UPC (FC/SC)
Connector Styles	FC, ST, SC Interchangeable	Graphical Display	Bar Graph and Table View
Memory Capacity	~500	Memory Capacity	1000 scans

General	
Display	4 in Color TFT
Memory Type	Internal and Flash Drive
Battery	Rechargeable NiMH - 8 hours operating time
Storage Temperature	-20 to 60 C
Operating Temperature Range	-10 to 50 C
Dimensions (w/out rubber boot)	7.75” L x 4.5” W x 2.25” H (197mm L x 114mm W x 57mm H)
Weight	2 lbs
Environmental	Operation -10°C to 50°C
Communications ports	USB and USB Flash Drive Ports
Accessories Provided	Universal Power Adapter w/US, UK, Continental Europe, and Australian Plugs, Interchangeable FC/ST and SC Adapters, Windows/Telcordia SR4731 Software, Rubber Boot and Manual on CD

Specifications are subject to change without notice

Visible Light Source	
Emitter Type	Laser Diode
Wavelength	650nm ±5nm
Connector Type	2.5mm Universal
Output Power	1mW Max.

Light Source Specifications	
Fiber Type	Single mode
Wavelengths	1310, 1550 ±20nm
Output Power	0 dBm (-3dBm @ 1625nm)
Laser Safety Classification	Class I Safety Per FDA/CDRH and IEC-825-1 Regulation
Modulation Modes	CW, 270 Hz, 1000 Hz, 2000 Hz

Power Meter Specifications	
Detector Type	InGaAs
Connector Type	2.5mm Interchangeable
Dynamic Range	+5 to -77dB (CATV - +25 to -57dB)
Calibrated Wavelengths	850,1300,1310,1490,1550,1625nm
Units of Measurement	dBm, dB
Resolution	.01 dB
Power Measurement Uncertainty	± 0.18 dB under reference conditions, ± 0.25 dB from 0 to -65 dBm, ± 0.35 dB from 0 to +5 dBm and from -65 to -77 dBm
Auto Test Range	0 to -40dB

Specifications are subject to change without notice

Chapter 19 Warranty and Repair

19.1 Warranty Information

This product, including all mechanical, electrical, and optical parts and assemblies are unconditionally warranted to be free of defects in workmanship and material for a period of one (1) year from the date of delivery.

This warranty does not apply to expendable parts such as batteries or optical panel connectors, nor to any instrument or component which has been subjected to misuse, alteration, or fiber connector damage. It is the customer's responsibility to understand all the instructions and specifications prior to operating this instrument. This warranty does not extend to any loss or damage consequent to the failure of the warranted product.

19.2 Repair Information

If repair is required, simply call the factory for return instructions and a RMA number.

Chapter 20 Trouble Shooting Guide

Symptom	Possible Cause	Solution
LCD dark	Power not on	Press ON/OFF key
	Batteries require recharging	Recharge batteries
	Batteries are missing, in backwards or need replacement	Check polarity, replace batteries, or contact factory for servicing
LCD white	Power cycled too quickly	Turn off wait 10 seconds – turn on
Instrument locked Up	Unexpected Operational Mode	Turn off (hold ON/OFF button in for 1 second) wait 10 seconds – then depress On/Off again button to turn the unit on.
Activity indicator does not change to standby or active mode	Power cycled too quickly	Turn off wait 10 seconds – turn on
Low or no power being displayed	Defective cord or dirty connector	Replace or clean cord
	Fiber Output port requires cleaning	Clean and inspect port
	Angle polish mated with UPC polish	Examine connector ends for damage. Use UPC Connectors ONLY!
USB hookup to PC not functioning properly	USB baud rate not set properly or too quick for computer	Set port baud rate properly or decrease Baud rate in instrument and certification software
	PC drivers not set properly	Un-install & re-install certification software and drivers
USB Flash Driver not functioning properly	USB flash drive full	Clean or use a new flash drive
	USB flash driver cycled too quickly	Turn power off wait 5 seconds turn back on

Chapter 21 Version Control

19.0 Version Control

Through a program of continuous improvement the upgrade of the features and performance of this instrument are an ongoing process. The version is displayed on Home Screen in the lower right hand corner of the display. The version changes and approximate release dates are as follows.

V0.2 – 7/2012 - Initial release date